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MODULAR HEATING AND/OR AIR CONDITIONING SYSTEM FOR A  
MOTOR VEHICLE

The invention relates to a heating and/or air  
5 conditioning system for a motor vehicle, according to  
the precharacterizing clause of claim 1.

EP 0 799 734 A2 discloses a heating and/or air  
conditioning system having a housing for a motor  
10 vehicle, it being possible for the housing to be  
assembled in a modular construction from a plurality of  
housing segments, and the housing being assembled  
before being installed in the motor vehicle. The  
installation in the motor vehicle proves problematic if  
15 there are crossmembers or other subassemblies  
restricting the installation space.

It is the object of the invention to develop a housing  
for a heating and/or air conditioning system for a  
20 motor vehicle in such a manner that the housing can be  
fitted into the motor vehicle in a simple manner and  
the functionality of the heating and/or air  
conditioning system can be expanded in a simple manner.

25 This object is achieved by a heating and/or air  
conditioning system having the features of claim 1. The  
subclaims relate to advantageous embodiments and  
developments of the invention.

30 The main concept of the invention resides in designing  
at least one housing segment of the housing for a  
heating and/or air conditioning system as an insert  
part, the insert part being inserted into the remaining  
housing only after the remaining housing is installed  
35 in the motor vehicle, the insert part comprising at  
least one additional functional subassembly. The design  
of at least one housing segment as an insert part makes  
it possible to fit the housing of the heating and/or

air conditioning system in the motor vehicle in a simple manner despite there being obstacles in the fitting space. This is undertaken by the other housing segments which are not designed as an insert part firstly being put together to form a remaining housing, and the remaining housing then being positioned around an obstacle in the fitting space and being fitted in the motor vehicle. The obstacle may be, for example, a crossmember running through the fitting space. After the remaining housing is installed in the motor vehicle, the insert part is inserted into the remaining housing and fastened, thus completing the fitting-together of the housing of the heating and/or air conditioning system in the motor vehicle. In addition, further functional subassemblies are integrated in the insert part, so that the functionality of the air conditioning system can be expanded in a simple manner. In the simplest case, the insert part comprises at least one air-guiding means, for example an air-guiding element or an air inlet or an air outlet.

In another embodiment, the functional subassembly comprises at least one mixing flap, it also being possible for the drive for the at least one mixing flap to be designed as part of the functional subassembly.

In a particularly advantageous development of the invention, the functional subassembly is designed as a mixing module, the air which is thermally controlled by the mixing module being mixed, for example, for a rear region in the motor vehicle.

The abovementioned measures make it possible for the insert part, in addition to facilitating the installation of the heating and/or air conditioning system in the motor vehicle, to expand the functionality of the heating and/or air conditioning system in a simple manner by interchanging the insert

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part. The remaining housing is thus composed in an essentially identical manner for the different functionalities, for example for the embodiment as a single-zone air conditioning system or multi-zone air conditioning system (two-zone or three-zone or four-zone air conditioning system); the corresponding insert part is merely to be inserted into the remaining housing in order to realize the desired functionality. It is also conceivable, for easier installation of the housing of the heating and/or air conditioning system in the motor vehicle, for a plurality of housing segments to be designed as insert parts.

The invention is explained in detail below using an exemplary embodiment and with reference to the drawing, in which:

fig. 1 shows a housing for a heating and/or air conditioning system;

fig. 2 shows a side view of the individual housing segments;

fig. 3 shows a side view of the housing for a heating and/or air conditioning system;

fig. 4 shows an insert part;

fig. 5a shows a front view of the insert part;

fig. 5b shows a sectional illustration of the insert part along the section line A-A.

Fig. 1 shows, in a schematic illustration, a housing 1 for a heating and/or air conditioning system. The housing 1 which is illustrated comprises a fan segment with a fresh air inlet 2.1 and a circulating-air inlet 2.2, a base segment 3, a right and a left air-

distributing and heat-transfer segment 4.1, 4.2 and an insert part 5, the air-distributing and heat-transfer segments 4.1, 4.2 having corresponding air discharge openings 6, and the insert part 5 likewise having two air discharge openings 7. As fig. 1 furthermore shows, in the exemplary embodiment illustrated the housing is arranged around a crossmember 8.

Fig. 2 shows a side view of the right air-distributing and heat-transfer segment 4.1, of the fan segment 2, the base segment 3 and of the insert part 5 before the housing for a heating and/or air conditioning system is fitted together.

Fig. 3 shows a side view of the housing 1 of a heating and/or air conditioning system for a motor vehicle, which housing is arranged around a crossmember 8 and has the insert part 5 already inserted.

Fig. 4 shows, in a schematic illustration, the insert part 5, which is broken open on the right-hand side, and its position with respect to a crossmember 8 present in the fitting space. Figs 5a and 5b show a front view and a sectional drawing, respectively, of the insert part 5. In the exemplary embodiment illustrated, the insert part 5 which is necessary for installing the housing 1 on or around the crossmember 8 is designed as a mixing module. This mixing module is used, for example, for ventilating the rear zone of the vehicle (rear region), the B-pillar, the central vent on the central console or else for the footwell. As can be gathered from fig. 5a, the insert part 5 is constructed symmetrically with respect to a longitudinal axis L and comprises two mixing flaps 5.1 for thermally controlling the air. The flaps 5.1 can be actuated by a continuous shaft with a motor or, as in the exemplary embodiment illustrated, by a respective motor 5.2 for separately setting the temperature on the

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right and left. There is a cold air supply 5.3 and a hot air supply 5.4 in each case in front of the mixing flaps 5.1. The mixing flaps 5.1 are illustrated in a central position, the movement of the mixing flaps 5.1 being limited by an upper end stop 5.6 (mixing position cold) and by a lower end stop 5.7 (mixing position hot). All of the hot air from a heating element (not illustrated) and from an optionally present PTC heater (likewise not illustrated) is guided through the mixing module 5 from bottom to top through two air ducts 5.5. The various air guides indicated above can be designed for ventilating the various zones of the vehicle as a function of the design of the insert part 5. Thus, for example, a two-zone heating and/or air conditioning system can be converted in a very simple manner by the insert part 5 illustrated into an at least three-zone heating and/or air conditioning system with thermally controllable ventilation of the rear or into a four-zone heating and/or air conditioning system, it being possible, in the case of the four-zone heating and/or air conditioning system, for the right and left rear regions to be ventilated separately and with differing thermal control, and it furthermore being possible for the same remaining housing to be used.